

# Cratogeomys castanops.

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## Cratogeomys castanops (Baird, 1852)

### Yellow-faced Pocket Gopher

*Pseudostoma castanops* Baird, 1852:313. Type locality "prairie road to Bent's Fort," near present town of Las Animas, Bent Co., Colorado.

*Geomys clarkii* Baird, 1855:322. Type locality "Presidio del Norte," on Rio Grande near present town of Ojinaga, Chihuahua, Mexico.

*Cratogeomys castanops*: Merriam, 1895:159. Generic description and first use of current name-combination.

**CONTEXT AND CONTENT.** Order Rodentia, Suborder Sciuromorphi, Infraorder Myomorpha, Superfamily Geomyoidea, Family Geomyidae, Genus *Cratogeomys* (which contains about seven species). Eighteen subspecies of *C. castanops* currently are recognized (Berry and Baker, 1972; Dowler and Genoways, 1979; Lee and Baker, 1987; Russell, 1968b):

- C. c. angusticeps* Nelson and Goldman, 1934:139. Type locality "Eagle Pass [Maverick Co.], Texas."
- C. c. bullatus* Russell and Baker, 1955:597. Type locality "2 mi. S and 6 1/2 mi. E Nava, 810 ft., Coahuila," Mexico.
- C. c. castanops* (Baird, 1852:313), see above.
- C. c. clarkii* (Baird, 1855:322), see above (*convexus* Nelson and Goldman is a synonym).
- C. c. consitus* Nelson and Goldman, 1934:140. Type locality "Gallego, Chihuahua, Mexico (altitude 5,500 feet)."
- C. c. excelsus* Nelson and Goldman, 1934:143. Type locality "San Pedro, 10 miles west of Laguna de Mayran, Coahuila, Mexico."
- C. c. hirtus* Nelson and Goldman, 1934:138. Type locality, "Albuquerque [Bernalillo Co.], New Mexico (altitude 5,500 feet)."
- C. c. jucundus* Russell and Baker, 1955:599. Type locality "Hermanas, 1205 ft., Coahuila," Mexico.
- C. c. parviceps* (Russell, 1968b:673). Type locality "18 mi. SW Alamogordo, 4400 ft., Otero Co., New Mexico."
- C. c. perexiguus* (Russell, 1968b:676). Type locality "6 mi. E Jaco, Chihuahua, 4500 ft., in Coahuila," Mexico.
- C. c. perplanus* Nelson and Goldman, 1934:136. Type locality "Tascosa, Oldham County, Texas (altitude 3,000 feet)" (*lacrimalis* Nelson and Goldman and *simulans* Russell are synonyms).
- C. c. pratensis* (Russell, 1968b:653). Type locality "8 mi. W and 3 mi. S Alpine, 5100 ft., Brewster Co., Texas."
- C. c. sordidulus* Russell and Baker, 1955:600. Type locality "1.5 mi. NW Ocampo, 3300 ft., Coahuila," Mexico.
- C. c. subsimus* Nelson and Goldman, 1934:144. Type locality "Jara [San Antonio de Jara], southeastern Coahuila, Mexico."
- C. c. surculus* (Russell, 1968b: 688). Type locality "La Zarca, Durango," Mexico.
- C. c. tamaulipensis* Nelson and Goldman, 1934:141. Type locality "Matamoros, Tamaulipas, Mexico."
- C. c. torridus* (Russell, 1968b:665). Type locality "3 mi. E Sierra Blanca, about 4000 ft., Hudspeth Co., Texas."
- C. c. ustulatus* Russell and Baker, 1955:598. Type locality "Don Martin, 800 ft., Coahuila," Mexico.

**DIAGNOSIS.** *Cratogeomys castanops* is a medium-sized pocket gopher. Outer surface of upper incisor with one median groove, as in other members of genus, slightly displaced inwardly; posterior surface of P4, M1, and M2 lacking enamel; M3 variable, quadriform or obcordate, posterior loph not elongate. Skull lacking strong platycephalic specializations; breadth across zygomata greater than that across squamosals; squamosals not overlapping parietals; basioccipital parallel-sided or hourglass-shaped; paraoccipital pro-

cesses small; angular processes short. The diploid chromosome number is 46 and the fundamental number is 86 (Hall, 1981; Lee and Baker, 1987; Russell, 1968b).

**GENERAL CHARACTERS.** *Cratogeomys castanops* is one of the smaller members of the genus (Fig. 1). "Pelage of upper parts varying in overall tones from pale yellowish-buff to dark reddish-brown, with a mixture of dark-tipped hairs on back and top of head; underparts whitish to bright ochraceous-buff; basally all hairs grayish, usually with slightly darker hues on dorsum" (Russell, 1968b:621); eyes relatively large in comparison with *Geomys* and *Thomomys*.

Skull (Fig. 2) is small to medium in size among species of *Cratogeomys*; top of cranium in adults usually convex in lateral view; zygomata strongly decurved; width across angular processes less than anteroposterior length of lower jaws; squamosals with well-developed postglenoid notch; upper incisors relatively slender; M3 monoprismatic, its posterior loph weakly developed, labial re-entrant fold shallow if present, and lateral enamel plates becoming reduced with age, often one (usually the inner) or occasionally both lacking in old individuals (Russell, 1968b). Premolars with double prisms, p4 largest tooth of molariform series; molars with simple tubular prisms, the posterior molar in both upper and lower series the shortest tooth (Merriam, 1895). The dental formula is i 1/1, c 0/0, p 1/1, m 3/3, total 20.

Ranges in external and cranial measurements (in mm) of 15 adult males and 28 adult females of *C. c. castanops* from Colorado (Russell, 1968b) and Kansas (Birney et al., 1971), are respectively, as follows: length of head and body, 193 to 221, 169 to 205; length of tail, 67 to 95, 59 to 84; length of hind foot, 35 to 40, 34 to 38; condylobasal length, 52.0 to 57.3, 48.1 to 51.0; zygomatic breadth, 34.1 to 39.9, 29.6 to 32.5; palatofrontal depth, 19.1 to 23.4, 18.4 to 19.9; palatal length, 37.2 to 41.0, 33.2 to 35.5; nasal length, 19.1 to 21.4, 16.8 to 18.6; breadth of braincase, 22.0 to 24.3, 20.6 to 22.8; squamosal breadth, 28.9 to 33.6, 26.6 to 28.5; rostral breadth, 11.5 to 12.9, 9.8 to 11.2; rostral length, 22.6 to 26.5, 20.9 to 23.2; alveolar length of maxillary toothrow, 9.7 to 10.9, 9.1 to 10.6. Ranges in weights (in g) for three males and six females of adult *C. c. perplanus* from western Texas, respectively, are 385 to 410 and 225 to 290.

**DISTRIBUTION.** In the United States, this species occurs from the Arkansas River drainage in eastern Colorado and western



FIG. 1. Yellow-faced pocket gopher, *Cratogeomys castanops perplanus*, from Lubbock County, Texas. Photograph by B. R. Davidow-Henry.



FIG. 2. Dorsal, ventral, and lateral views of skull and lateral view of lower jaw of *Cratogeomys castanops perplanus* from Dawson County, Texas (female, no. 26034, The Museum, Texas Tech University). Condylobasal length of skull is 53.5 mm. Photographs by N. L. Olson.

Kansas southward through the Oklahoma Panhandle, western Texas, and eastern New Mexico to the Rio Grande (Fig. 3), and also immediately to the east of the Rio Grande in central New Mexico (Hall, 1981); it is known also from one area in Cameron County, Texas (Cleveland, 1977), in the lower Rio Grande Valley. In Mexico, the distributional status of *C. castanops* is questionable because of the presence within the former range (Hall, 1981) of two cytotypes



FIG. 3. Approximate distribution of the yellow-faced pocket gopher, *Cratogeomys castanops* (modified after Hall, 1981; Helenthal and Price, 1976; and Lee and Baker, 1987).

that apparently represent distinct species (Lee and Baker, 1987). It occurs south of the Rio Grande in eastern Chihuahua and north-eastern Durango, probably to southern Coahuila and northern Zacatecas, in parts of Nuevo Leon, and eastward along the south side of the Rio Grande to the Gulf Coast in Tamaulipas. Subspecies are not delimited on the map (Fig. 3) because of the uncertain status of some Mexican populations, and because one of us (Hollander) currently is revising *C. castanops* to the north of the Rio Grande, a study that will result in both distributional and nomenclatural changes involving subspecies.

**FOSSIL RECORD.** *Cratogeomys castanops* is not known from Pleistocene deposits older than Wisconsin times according to Russell (1968a), but the genus is recorded from the pre-Pleistocene (Pliocene) Benson Beds of Arizona from which *C. bensoni* Gidley, 1922, was named. Russell attributed this to a proposed southern distribution of the genus, probably on the central Mexican Plateau, an area where few early to middle Pleistocene deposits have been found. In outlining the intraspecific population structure of *C. castanops*, Russell (1969) hypothesized the retreat of the genus from the southwestern United States during the Wisconsin pluvial cycle, with a subsequent postglacial reinvasion of the region. Harris (1985) questioned Russell's hypothesis, pointing out the occurrence of *C. castanops* at several stadial sites in the Guadalupe Mountains and elsewhere, indicating that populations were maintained farther north than envisioned by Russell (1968a).

Records of *C. castanops* remains have been reported by Rinker (1941) from Meade County, Kansas, from a Recent terrace, and by Gilmore (1947) as being common in Quaternary cave deposits near Cuatro Ciénegas, Coahuila. Mooser and Dalquest (1975) reported *C. cf. castanops* remains from Pleistocene (probably Illinoian) deposits at Cedazo, Aguascalientes, in central Mexico. In a compilation of Quaternary mammalian faunas of the southwestern plains, Graham (1987) discussed *C. castanops* remains from the following

Texas localities: Cueva Quebrada (late Pleistocene, >14,000 years BP); Bonfire Shelter (approximately 10,200 BP); Baker Cave (Level IV, middle Holocene, 3,000 to 6,000 BP); Devil's Mouth (undifferentiated Holocene); Deadman's Shelter, Canyon City Club Cave (levels 1 to 5); Alibates 28, Roper, and Spring Canyon (all from late Holocene, 300 to 3,000 BP). It also has been reported (Harris, 1985) from Dry Cave, Burnet Cave, and Dark Canyon Cave, Eddy Co., New Mexico; Upper Sloth Cave, Williams Cave, and Fowlkes Cave (Dalquest and Stangl, 1984), Culberson Co., Texas; Jimenez Cave, Chihuahua, Mexico; and San Josecito Cave, Nuevo Leon, Mexico; all of late Wisconsin age.

**FORM AND FUNCTION.** The phallus of *C. castanops* is medium-sized in comparison with the phalli of other species of *Cratogeomys*. "The length of the distal tract, which ranged from 10.3 to 12.9 mm in adult specimens examined, is about five times greater than the width and about twice as long as the length of the glans. The sides of the glans, viewed dorsoventrally, tend to be parallel or converge to the apex. Viewed laterally the sides are more or less straight and parallel, with a slight flare on the ventral side in the region of the collar" (Williams, 1982:47-48). A poorly developed collar may be apparent on the dorsal side of the glans.

Length of baculum ranged from 9.1 to 10.8 mm in 25 males (Williams, 1982). The bone is unique among geomyid rodents in having a massive appearance. "Viewed dorsoventrally there is a distinct base that is straight or slightly concave on the end. The base tapers to a relatively broad shaft that has straight parallel sides. There is a slight indentation of the shaft just proximal to the broad tip. Viewed laterally the base and tip are less evident as they join the shaft to form a relatively straight baculum" (Williams, 1982:48). The bacula of juveniles and subadults differ from those of adult males in having a wider median shaft (Ikenberry, 1964).

Seminal vesicles are turgid in sexually active males, whereas those of adult males in nonbreeding condition are opaque, lying against the base of the dorsal portion of the prostate gland. In subadults, the seminal vesicles are pink and flaccid, occupying the same position as those of the inactive adult (Ikenberry, 1964).

Females with perforated vaginae and turgid genitalia were collected in Lubbock County, Texas, between January and July. Examination of reproductive tracts revealed the females to be pregnant, postparturient, or in estrous (Ikenberry, 1964). Females possess three pairs of mammae. Ikenberry reported finding two females each with an extra nipple in the right pectoral position. Mammary glands of lactating females are large pinkish masses covering the entire subcutaneous thoracic and pelvic regions.

Juvenile pelage is straw-colored to pale grayish-yellow and of a fine texture, contrasting markedly with that of adults; pigment of the hair shaft is solid. "Postjuvenile molt evidently begins on the head and proceeds posteriorly to the level of the eyes and ears, and at the same time proceeds ventrad over the cheeks and upper throat. Thereafter, the venter must molt rather rapidly, because we found few animals in process of ventral molt, adult pelage being already in place even though molt on the dorsum was evident and frequently less than half completed. From the region of the eyes and ears, molt progresses posteriorly on the dorsum, with middorsal areas molting sooner than the flanks, the posterior part of which, along with the area at the base of the tail, being the last to molt" (Davidow-Henry and Jones, 1988:459-460).

Adult pelage has a yellowish-brown pigmentation on the distal half of the hair, whereas the proximal half is pale brown to gray. Adult molt in the Lubbock County, Texas, population of *C. c. perplanus* seemed to begin in August and continue through March (Ikenberry, 1964). Although new pelage was thicker, there was no change in its color. However, apparently distinctive semiannual molts in adults have been reported in Kansas—"molt from a winter to a summer pelage early in spring (prior to late May) and [an] autumnal molt in September and October" (Birney et al., 1971:372).

Males are larger than females in *C. castanops*. Males of all genera of pocket gophers continue to grow after attaining sexual maturity, but females grow little after reaching sexual maturity (Chase et al., 1982). Judd and Reichman (1972) compared water requirements of *C. castanops* and *Thomomys bottae* and concluded that the former conserved available water more efficiently.

**ONTOGENY AND REPRODUCTION.** Pregnant females were recorded in June, July, and August in Trans-Pecos Texas by Schmidly (1977), suggesting to him that two litters are produced each year. In Kansas, Birney et al. (1971) suggested that female

*C. castanops* may bear a litter in late March or early April and another in late summer or early autumn. In Coahuila, this species also has two distinct breeding seasons according to Baker (1956), in winter (December to March) and in summer (June to August). Lactation was observed by him in January, June, and July. Fetal counts ranged from one to three with a mean of 1.8. However, Smolen et al. (1980) reported that females produce multiple litters annually in the vicinity of Lubbock, Texas; three individuals had a minimum of three litters and probably four in one reproductive season. In Texas, gravid females have been reported from every month of the year (Davidow-Henry and Jones, 1988; Ikenberry, 1964; Smolen et al., 1980). Twenty-five pregnant females carried an average of 2.08 (range, 1 to 4) fetuses (Davidow-Henry and Jones, 1988). Hegdal et al. (1965) reported litter size as averaging 3.8 (range, 1 to 5) near Carlsbad, New Mexico, and suggested that the breeding season was prolonged, possibly year-round, in that area.

Reproductive activity in *C. castanops* begins in Lubbock County, Texas, as early as November, gradually increasing to a peak in March and April (Smolen et al., 1980). Immature females first captured during the period from December to May were pregnant and lactating by July. Incidences of plural occupancy of male and female gophers in one burrow were observed in January, February, and October, suggesting that males are reproductively active as early as October. During mating and copulation, the male emits low guttural squeaks throughout exploratory activities; when body contact is made, the male bites the female (Ikenberry, 1964).

Based upon fetal counts, the primary sex ratio of *C. castanops* in Lubbock County, Texas, was 46.2% male and 53.8% female; in juvenile and adult specimens, the sex ratio was 40.4% males to 59.6% females (Ikenberry, 1964). However, the sex ratio of 42 immature gophers from Carlsbad, New Mexico, was 1:1, whereas among 60 adults the ratio was 22 males to 100 females (Hegdal et al., 1965). In one study, longevity of females averaged 56 weeks, with some living as long as 86 weeks; male longevity averaged only 31 weeks (Smolen et al., 1980).

Observations of a live-trapped female and her two young revealed that the offspring suckled while the mother sat on her haunches. The young lay on their backs to feed, but were not firmly attached to the nipples. As they nursed, the mother manipulated the young with her foreclaws to position them. She also groomed them with her mouth. The young emitted high-pitched squeaks when the female left the nest, but she did not visibly react to their cries (Hickman, 1975).

Neonates are naked and blind. Three from the same litter had the following respective measurements (Hegdal et al., 1965), taken (in mm) 24 h after birth: total length, 55.8, 53.2, 47.3; length of tail, 12.8, 11.3, 9.3; length of hind foot, 7.7, 6.6, 5.7; weight (in g), 7.9, 6.5, 3.8.

When young animals are old enough to leave the nest, they travel about maternal burrows, and can be caught easily in traps. When nearly full grown, they disperse from the parental burrow (Bailey, 1932).

**ECOLOGY.** *Cratogeomys castanops* usually inhabits deep sandy or silty soils that are relatively free from rocks. Bailey (1932:243), for example, reported that this pocket gopher generally is found in "rich mellow soil" of valleys avoiding the "hard soil of the arid mesas and the upper slopes." Where *Geomys* is present, however, *Cratogeomys* is restricted to denser, shallower, sometimes rocky soils (Birney et al., 1971; Findley, 1987), although it is thought to be displacing *G. arenarius* in parts of the range of that species (Williams and Baker, 1974). In southeastern Colorado, the distributions of *C. castanops* and *T. bottae* overlap for a distance of approximately 5 km on Mesa de Maya, but the two are allopatric below the mesa (Moulton et al., 1983:53). In the zone of sympatry, "where these two species occupy adjacent burrows in the same soil and vegetation, the average depths of their feeding burrows differ significantly," reducing the frequency of interspecific contacts. In Union County, New Mexico, Best (1973) found that *C. castanops* occurred in significantly shallower soils than either *Thomomys* or *Geomys*. Where *Thomomys* and *Cratogeomys* are parapatric, Findley (1987) noted that it is the latter that preempts the favored sites, with *Thomomys* "limited to shallow, hard, frequently rocky soils" (Hollander et al., 1987:5). Davis (1940:205) suggested "that such large-bodied burrowing rodents as adult *Cratogeomys* cannot succeed in the extremely rocky, thin soils to which *Thomomys* appears to be restricted." Schmidly (1977) reported *C. castanops* as common

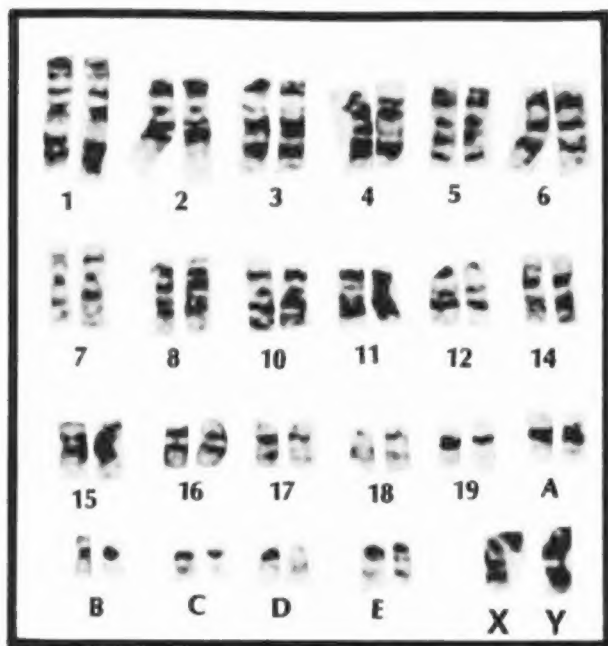


FIG. 4. Karyotype of male *Cratogeomys castanops perplanus* from Lubbock County, Texas (after Lee and Baker, 1987).

in the sandy-loam river bottom soil along the Rio Grande. It has replaced *T. bottae* within recent years at several places in Trans-Pecos Texas (Reichman and Baker, 1972; Williams and Baker, 1976), where the latter once occupied fluvial soils; apparently, *C. castanops* is favored as conditions become more xeric. Conversely, *Geomys* evidently has replaced *Cratogeomys* in parts of northeastern New Mexico and southeastern Colorado (Best, 1973; Miller, 1964; Moulton, et al., 1983). A minimal depth of topsoil required for *C. castanops* is 175 to 200 cm (Russell, 1968b). Best (1973:1316) found "differential levels of tolerance to soil types" among *C. castanops*, *G. bursarius*, and *T. bottae*, but that *Cratogeomys* and *Thomomys* were similar in being limited to firmer soils in the presence of *Geomys*. Hermann (1950) noted that typical vegetation associated with *C. castanops* consisted of *Prosopis juliflora* (mesquite), *Florensia* sp. (tarbush), *Larrea tridentata* (creosotebush), and *Microrhamnus ericoides* (small-leaved buckhorn). In Kansas, Birney et al. (1971:368-369) took *C. castanops* "almost exclusively in deep upland soils of the High Plains." Also, *Cratogeomys* inhabited "pastures of native short grasses and adjacent roadside ditches in those areas characterized by loamy soils having calcareous deposits in either surface or subsurface layers." At Sierra Blanca, Texas, Bailey (1895:44) reported *C. castanops* as found on a "dry, gravelly mesa amid such desert plants as cactuses, mesquites, acacias, and yuccas." It has been hypothesized that 46 cm or more of precipitation annually favors *G. bursarius* over *C. castanops* (Russell, 1968b).

Small carnivorous mammals and large hawks and owls have been documented as preying on *C. castanops* (Chase et al., 1982; Jones et al., 1985). *C. castanops* populations have been significantly reduced when in close proximity to roosting sites of birds of prey (Chase et al., 1982). Bailey (1932) underscored this observation with an anecdote from the Davis Mountains of Texas. Horned owls kept the local population of *C. castanops* in check and out of an alfalfa patch until farmers removed the owls for fear they would kill chickens. Once the owls were gone, the *Cratogeomys* population flourished and moved into the alfalfa patch.

Lice (Mallophaga) reported from *C. castanops* include *Geomydoecus expansus*, *G. taulipias*, and *G. ustulati* (Hellenthal and Price, 1976). In the Colorado population of *C. castanops* studied by Miller and Ward (1960), the flea, *Foxella ignota* (Siphonaptera), was reported on all three genera of pocket gophers, whereas *Dactylopsylla percernis* was found only on *C. castanops*. However, *Dactylopsylla* was relatively rare and individuals occurred only singly or in pairs on hosts. Birney et al. (1971) also reported finding *D. percernis* on *C. castanops* in Kansas. The following laelaprid mites were recorded by Whitaker and Wilson (1974) as occurring

on the yellow-faced pocket gopher: *Androlaelaps fahrenheitsi*, *A. geomys*, *Haemogamasus ambulans*, and *Hirstionyssus femoralis*.

Bailey (1932:244) reported that these pocket gophers are "especially obnoxious tenants on well-cultivated farms . . . they do considerable damage in orchards, gardens and potato fields by eating the roots, tubers, and other underground parts of trees and plants." Because *C. castanops* often occupies soils suited for farming purposes, this gopher conflicts frequently, often seriously, with the interests of man. Their concentration on the best soils, together with the large size of their burrows and mounds, makes them one of the most injurious members of the family Geomyidae (Bailey, 1905). Russell and Baker (1955) noted that yellow-faced pocket gophers fed on fleshy, tuberous roots of desert shrubs and roots and leaves of low-growing forbs in Coahuila, whereas Hermann (1950) concluded that lechugilla (*Agave lechugilla*) is the principal food of this species on the Stockton Plateau of Texas. Bailey (1932) reported that a great variety of plants is consumed by *C. castanops*, but that clovers and related plants seem to be favored foods; stomach contents revealed green vegetative material generally containing a large portion of pulp from roots and underground vegetation.

Hickman (1977a) excavated five burrow systems of *C. castanops* in Lubbock County, Texas, and recorded that tunnels averaged 75.8 m (range, 42 to 104) in length, had numerous shorter burrows (laterals) leading away from the main tunnel for a distance of 0.3 to 3.0 m, and had distinct levels—a shallower, more extensive network for foraging, and a deep level that contained the nest and food chambers. Depth of tunnels ranged from 10 to 132 cm, with mean tunnel diameter ranging from 8.9 to 12.7 cm. Best (1973) recorded mean burrow depth as 16.5 cm in Union County, New Mexico, shallower than *Geomys*, but deeper than *Thomomys*; mean burrow diameter averaged 9.0 cm. On Mesa de Maya, Colorado, burrows of *C. castanops* averaged 22.1 (13.5 to 31.0) cm in depth where this species was sympatric with *T. bottae*, which had shallower burrows (average 15.45 cm); the burrows of both species averaged slightly deeper in areas of allopatry (Moulton et al., 1983). No special defecation chambers were found in burrow systems (Hickman, 1977a), feces being scattered along runways, thrown out in mound building, incorporated into plugs, or packed (along with dried grass and soil) into old lateral tunnels. Plugs and mounds embedded with dry grass and feces appear to be a singular feature of *C. castanops* burrows. Similar to *Geomys* and contrasting with *Thomomys*, there is one functional nest per burrow system with one entrance, old nests or those heavily parasitized being abandoned and often plugged with dirt (Hickman, 1977a). Hickman also reported that a distinctive feature of *Cratogeomys* burrow structure is the lack of a distinct shaft to a deep tunnel system, only gradual ramps. Camel crickets (*Ceuthophilus*) and tiger salamanders (*Ambystoma tigrinum*) were found in occupied burrows; coleopteran larva occupied old nests. Young gophers sometimes take over a plugged-off portion of the maternal system rather than disperse otherwise.

**BEHAVIOR.** Interactions between *C. castanops* and associated subterranean dwellers indicated that beetles and earthworms were ignored, whereas a salamander, *Ambystoma tigrinum*, was picked up in the gopher's mouth and moved out of the way. Under experimental conditions, in one instance, a yellow-faced pocket gopher killed a *Thomomys* placed in the same burrow (Hickman, 1977c).

Swimming ability in *C. castanops* was recorded by Hickman (1977b). He reported that this gopher is less durable than other genera when in water, and suggested that the greater bulk of *C. castanops* inhibited its endurance. Best and Hart (1976) also found that *C. castanops* could not swim as well as individuals of two species of *Geomys*. Therefore, water barriers may pose a more serious distributional constraint on *C. castanops* than on gophers of other genera. Otherwise, yellow-faced pocket gophers have large home ranges and exhibit considerable vagility, most likely including overland movements (Williams and Baker, 1976).

Most foraging is done from the burrow system, plants being pulled into the burrow by their roots. Green vegetation also is gathered from about burrow openings. Any plants within reach are cut off at the bottom and drawn down into the burrow until they can be cut into suitably-sized sections for carrying in the cheek pouches (Bailey, 1932).

As in other pocket gophers, a burrow system normally is inhabited by one individual, dual occupancy taking place only for short periods during the reproductive season and when young still are with



the female (Hegdal et al., 1965). Russell (1954), for example, reported a nonpregnant but lactating female, an adult male, and an immature female trapped from the same burrow in Coahuila. Hegdal et al. (1965) recorded the following plural catches from one burrow system in addition to females with young: two adult females; an adult male and one young; and an adult female with an adult male.

**GENETICS.** Analysis of starch-gel electrophoretic data of the Geomyinae led Honeycutt and Williams (1982) to recognize *Cratogeomys* as a genus distinct from *Pappogeomys*. Cladistic analysis of those genic data indicated that *C. castanops* formed a sister group to *C. fumosus*, *C. gymmurus*, *C. tylosinus*, and *C. zinsleri*. Berry and Baker (1972) described two cytotypes of *C. castanops* (as understood by Russell, 1968b) based on nondifferentially-stained karyotypes. They reported that all specimens examined from north of 25°N latitude possessed a diploid number of 46 with a fundamental number of 86 (Fig. 4), whereas specimens examined from south of 25°N latitude had a 2N = 42 with a FN = 78. Cladistic analysis of differentially-stained karyotypes demonstrated that at least six chromosomal rearrangements (Lee and Baker, 1987) separate the two cytotypes of *C. castanops*. From this analysis, Lee and Baker (1987) suggested recognition of the two cytotypes as distinct species, with *C. castanops* represented by the 2N = 46 and FN = 86 cytotype. The specific name of the 2N = 42 and FN = 78 cytotype probably is *Cratogeomys goldmani* (but see Lee and Baker, 1987), with seven subspecies.

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